INLAND WATERWAYS OF NORTH-WESTERN CANADA


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Sep 1/99

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OF

North-Western Canada.

BY

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At the Annual Meeting of the Winnipeg Board of Trade held in February, 1897, a resolution was unanimously adopted in which it was claimed,—"That in the opinion of this Board the question of Immigration is the most important one that engages the attention of the people of this Province, and of the Government of the Province and Dominion" . . . . . "and that the most important factor in the settlement of the country is the securing of low rates of transportation for the products of this country to the markets of the world. That, in the opinion of this Board, an immediate announcement of reduction in the rates on grain from a central point in Manitoba, say Portage la Prairie, to Lake Superior points, from 17c per 100 lbs. to a maximum of 12½c per 100 lbs., and proportionately from other points in Manitoba and the North-West Territories, would do more to encourage the farmers and promote immigration to the country than the annual expenditure of such a sum as this reduction would give, if expended in any other manner."

Prior, as well as subsequent, to the date of this resolution, various schemes have been promoted to reduce the cost of transporting our products to the seaboard. A railway line to Hudson's Bay, and a competing line to Lake Superior, have particularly received attention, while a water route to Hudson's Bay also has its advocates. All of these schemes have met with opposition from one cause or another. The Hudson's Bay Railway route entails a haul of about 700 miles north, necessarily involving high rates of freight, which it has been hoped might be counterbalanced by a low rate of ocean freight to Liverpool, the latter being dependent on the successful navigation of the Straits for a sufficient period of time. The possibility of this is at present, in many minds, a question of doubt, no matter what its advocates may claim; but it seems to the writer after reading the whole of Mr. Fisher's comprehensive report on the subject that he has collected a vast amount of information, which must convince the most skeptical that the straits present difficulties in the way of

navigation that will always operate to destroy its value as a great trade route. No commerce of any magnitude or importance can be successfully established over a route that is absolutely blockaded for upwards of seven months of each year. While Hudson's Straits are blocked with ice there is absolutely no means of communication between the Bay ports and the markets of the world; and this is a most important point to bear in mind when comparing this route with one to the south or east in connection with the Great Lakes. When navigation is closed on the latter we still have the railways connecting us with the great centres of domestic trade, and with ocean ports that are open all the year round. Let Manitoba drop this polar chimera; it never was anything but a political and speculative dream, and never can be anything else.

The Hudson's Bay route entails a deflection of export traffic to the north, in a direction far removed from the current of domestic trade and from its centres, and the writer is not aware of any instance in which trade routes that depart from the lines of domestic traffic have been successfully established. A well-known authority, Lyman E. Cooley, C.E., of Chicago, asserts:—"If you consult the history of canals and railways you will find the line of domestic transportation determines the line of foreign shipment." The Mississippi River, with its navigable tributaries and railway connections, penetrating an immense producing district, affords proof of the hopelessness of endeavoring to divert export traffic from the line of domestic trade. The great grain producing States of Illinois, Indiana, Iowa, Kansas and Nebraska are much closer to the river ports than they are to the Atlantic, but the proportion of their export traffic which finds its way to the ocean via New Orleans is infinitesimal compared with that which reaches the Atlantic and St. Lawrence River ports.

Capt. Eads, the distinguished engineer and projector of the Mississippi Jetties, once held the view that the advantages of the Mississippi route would compel the trade of the States named to seek its outlet by this Channel. Thirty years ago, in addressing the River and Harbour Convention at St. Louis, he spoke as follows:—

"The improvement of the Mississippi River involves the contemplation of one of the sublimest physical wonders of a beneficent Creator. The boundless reservoirs which supply its channels through such long periods of the year, and make it so valuable to man, and which, if opened simultaneously, would overwhelm the valley and mar its usefulness, are, with that thoughful care which orders all things wisely, unlocked in beautiful succession, month after month, by the touch of Spring, as she leaves her home in the tropics to bless the colder regions of the north.

"This great stream, with its head shrouded in Arctic snows, and

embracing half a continent in the hundred thousand miles of its curious network, and coursing its majestic way to the Southern Gulf, through lands so fertile that human ingenuity is overtaxed to harvest their productiveness, has been given by its Immortal Architect into the jealous keeping of this Republic. . . . This great valley lies between those parallels of latitude that are known to be most conducive to health and to the development of the mental and physical energies of man. In its capacity to produce the cereals, grasses, cotton, sugar, tobacco, hemp, vegetables and fruits of every kind; in the richness and variety of mineral wealth, the grandeur and value of its forests, its inexhaustible quarries; in a word,—in all the natural resources which conspire to increase the wealth and power of a people, the bounty of Providence has been most wonderfully manifested.

"The stream which, in every direction, penetrates this favoured region, and is the grandest natural feature of North America, holds in its embrace the destinies of the American people.

"It is the great arterial system of this Republic. . . . . Through its copious channels, for all time to come, are destined to circulate the sustenance and abundance of its people.

"The commerce of this great empire will, in time, certainly exceed that of any other in Christendom; and the mouth of the great river constitutes the only natural gateway through which the immense products of that region will henceforth find their way to the various nations of the earth."

The Jetties were completed in 1876, and a channel 22 feet in depth obtained at a cost of 5½ millions. And what was the result of this effort to divert export trade from the line of domestic transport? It is shown in the following report of the movement of cereals for the year 1896, twenty years after the completion of this great work:

Shipments of Grain, Flour and Meal (in bushels at 4½ bushels to the barrel) for all the principal Atlantic and Gulf Ports for the year 1896:—

	Wheat and Flour.	Corn.	Oats and Barley.	Rye, Pease and Meal.	
Atlantic Ports.....	94,800,591	83,174,471	37,872,514	4,964,032	220,811,608
Montreal.....	14,429,307	6,795,104	2,965,571	2,503,544	26,693,526
New Orleans (Mississippi River)	5,056,530	25,292,502	262,143	17,700	30,628,875
Galveston (Railways).....	3,693,371	6,222,282	.....	.....	9,915,653
	117,979,799	121,484,359	41,100,228	7,485,276	288,049,662

These are facts the significance of which cannot be overlooked in determining upon the proper route for a trade outlet such as we require. It cannot be claimed that the United States Atlantic ports draw this trade from their Gulf ports entirely on account of the shorter ocean voyage to Liverpool, for, if this was a very potent factor, why is Montreal so far behind in export shipments? It is 460 miles nearer Liverpool than New York, and has the St. Lawrence and Welland canals, with a depth of 9 to 14 feet, to help it, as compared with the Erie Canal of only 6½ feet effective depth. Is it not because the largest centres of domestic consumption, trade and commerce are found in the Atlantic States of the Union, and not in Eastern Canada or the Gulf States? There can hardly be any doubt that this is the controlling factor in determining this problem.

It seems quite clear, therefore, that "the line of export trade is determined by the line of domestic trade," and we must bear this in mind in considering the question of an outlet for our products.

As Eastern Canada grows into a manufacturing centre it will become to us what the Eastern States have become to the Western, the centre of domestic consumption, and our trade outlet and inlet should be located where it will enable us to reach that manufacturing centre in the cheapest manner possible.

The Canadian Pacific Railway will always be able to dictate terms to any railway to Hudson's Bay, and has nothing to fear from competition in that direction. Its main line and branches penetrate the richest and most productive portion of Manitoba and the North-West Territories, and its haul from a common point of deflection, say Portage la Prairie to Hudson's Bay and Lake Superior, is but little over half the distance to the Bay. At Lake Superior it finds a water route to the consuming centres of Canada and the United States, and to the ports of Montreal and New York. It has connections on Lake Superior with one of the largest mercantile fleets in the world, and lower rates of freight to Buffalo and Port Colborne, than are charged for a corresponding distance even on the ocean.

These facts should convince us that our requirements would be best served by securing cheaper freight rates to Lake Superior points, where connection by water with ocean ports and all the requirements for prompt handling of a large domestic and export traffic are already established.

Any other route than this will always receive the active opposition of Eastern Canada, and we may as well take it for granted that the spirit which prompted our people there to undertake and carry to completion the gigantic task of building the Canadian Pacific Railway will be exerted in the strongest possible manner to prevent the loss of trade to them which the railway was intended to promote. It will be wise, therefore, for us to endeavor to gain their

sympathy and assistance in accomplishing our object to secure lower freight rates.

The only schemes having Lake Superior as an outlet that have received any degree of attention are a railway to Duluth, and the Manitoba South-Eastern Railway and connections to Fort William, now under construction. The latter is being aided by our Provincial Government, with the avowed object of securing a reduction on wheat to 10 cents per 100 lbs., or 6.2 cents per bushel from Winnipeg to Fort William. This will be a step in the right direction, and will prove a great boon to the Province and North-West Territories if the proposed road gets any of the wheat. But it must be remembered that Winnipeg is the Eastern extremity of the wheat growing districts, that the Canadian Pacific and its connections, and the Northern Pacific, both having outlets on Lake Superior, are the only lines which penetrate those districts and collect traffic; that the only district likely to benefit materially by the construction of this outlet will be that served by the Dauphin Railway, which is under the same management; and that under existing laws there is no power to compel the other lines to transfer freight to a rival line to Lake Superior. Even if the Provincial Government succeeds in securing the construction of this line and the establishment of the 10-cent rate, there can be no guarantee that it will prove effective in fully accomplishing its object until western connections for the new systems have been obtained.

In regard to the line to Duluth, objections have been raised to grant Provincial aid to a railway to this port, on the grounds that it would divert Canadian trade into American channels, and build up American cities at the expense of our own; and our Government will be upheld by public opinion in deciding to concentrate their efforts in promoting the construction of the lines to Fort William in preference to Duluth. The construction of the Red River Valley Railway did not divert any traffic collected by the Canadian Pacific Railway to the south, and had it not been for the construction of the two branch lines to Portage and Brandon, the traffic over the main line from Winnipeg to Emerson would not pay operating expenses. The net earnings for main line and branches for the year ending June 30, 1897, were less than $12,000.00. In the preceding year they were less than $3,000.00. The experience of this competing line does not afford much encouragement for the investment of capital in a third railway from Winnipeg to Lake Superior, and nothing but public aid of a most unusually liberal character could have induced Messrs. MacKenzie & Mann to undertake its construction. But granted that the desire of the promoters is fulfilled, and that 10c per 100 lbs. on grain becomes the railway rate from Winnipeg to Lake Superior points,—granted also that rates from points

west of Winnipeg are not increased by way of compensation for this reduction, there still remains the fact that the traffic must all be handled by rail. And there is a limit below which railways in this country cannot haul in its present conditions, and the present volume of traffic, without absolute loss.

But given a largely increased trade, especially in westbound traffic, then lower rates on our products can be profitably given. This west-bound traffic can only be secured by a large increase in our population to serve as consumers for the manufactures and merchandise which must come from or through Eastern Canada. It results, then, that, even with a ten-cent rate on grain from Winnipeg to the Lakes, heavy rates on transportation generally will still confront us until the country is filled up with a large population, while the growth of population is itself retarded by the continuance of high rates.

Is there no other way of reaching a solution of the difficulty, one that will lead to a general lowering of freight rates between points far west of Winnipeg and the Lakes? The writer ventures to say that there is, and that this solution is to be found in the development of navigation on the numerous rivers and lakes between Lake Superior and the far West; in other words, the writer believes that a magificent system of waterways is capable of being opened, at a reasonable cost, that will reach from the Lakes to the farthest bounds of the rich prairies of Manitoba and the Territories. We have been singularly favoured in possibilities in this respect. Probably no such extensive territory in the world apart from the St. Lawrence and Mississippi valleys is possessed of such advantages for furnishing cheap transportation facilities as our vast prairie stretches.

A most important feature at the same time in connection with these rivers and lakes is that they are all located on the line of our domestic and export traffic routes.

Between Fort William and the Red River, a distance of 453 miles by the old Dawson Route, we have actually 305 miles of navigable waters. The remainder of the distance is made up of 40 miles of land between Fort William and Lake Shebandowan; seven miles in several short sections between this lake and Fort Frances; and 101 miles from Lake of the Woods to Winnipeg. This route is practically all within Canadian Territory; a portion passing through the Lakes and Rivers on the International Boundary. Its establishment would assist in reclaiming and developing a portion of this Province east of the Red River, as well as an extensive part of the Province of Ontario rich in minerals, timber and agricultural lands. It would carry our products to a Canadian port, and build up a second Duluth and Superior at Fort William and Port Arthur.

On the first section of 40 miles between Fort William and Lake

Shebandowan we encounter the only serious obstacle to connecting Lake Superior with a stretch of navigable waters, or waters capable of being rendered navigable, reaching almost to the foothills of the Rocky Mountains. The bare possibility of establishing continuous navigation from our most westerly prairies to the Lakes suggests such stupendous advantages that it is surely advisable to consider earnestly whether this serious obstacle may not be overcome.

The total rise in this section of 40 miles is 869 feet, and to ascertain whether a feasible route by water can be established over it will require very careful examination by competent engineers. It was examined by Dawson, and he reports as follows: (1869)—

"As may be supposed, the streams running down from such a height in so short a distance have a very rapid course, and as a consequence could only be rendered navigable at an expenditure which, whatever the future may require, is quite out of the question for the present."

This opinion was written when the Government of the day was first endeavoring to open up the cheapest possible line of communication between Eastern Canada and the West, and when our public men had no conception of the development that has since taken place. The question of an outlet for our surplus products was not then at issue.

It will perhaps be found on making surveys that the greater portion of this rise can be overcome by the use of pneumatic lift locks such as have been proposed for the ship canal around Niagara Falls, and are now under construction on the enlargement of the Erie Canal at Lockport, N.Y. Or, a feasible route for a ship railway might be found over which barges with their cargoes can be transferred between Fort William and Lake Shebandowan.

The distance from Lake Shebandowan to the north-west angle of Lake of the Woods is 312 miles, all deep navigable water except about seven (7) miles in ten sections; three of which are each two miles in length, and the remainder from 10 to 12 chains each. The total lockage is about 463 feet, made up of 29 feet up from Shebandowan to Kashaboiwe, and 434 down to Lake of the Woods, an average of only 1.48 feet per mile. The Rideau Canal has 457 feet of lockage in 126 miles, an average of 3.63 feet per mile, so that, in proportion to the distance, the section under consideration requires but little over one-third the lockage of the Rideau Canal.

The Erie Canal from Lockport to Albany, a distance of 321 miles, has a total lockage of 655 feet, or 2.04 feet per mile, while on this route from Buffalo to Albany, 352 miles, there is about 270 miles of canal and 82 of canalized river, as compared with 7 miles of canal and 305 miles of wide and deep lakes and rivers on the Dawson route, giving the latter a tremendous advantage in capacity and in the speed at which boats may travel.

The Welland Canal, between Lakes Erie and Ontario, has 327 feet of lockage in 27 miles, or over 12 feet per mile. The St. Lawrence canals from the head of Galops Rapids to Montreal have a total lockage of 220 feet in 110 miles, an average of two feet per mile.

From these figures it will be seen that this, the longest section of the suggested route, has a decided advantage in lockage and capacity over any of the important canals mentioned.

The accompanying profile, constructed from information derived from "Dawson's Reports," and "Upham's Altitudes," shows approximately the elevation of the different lakes, etc., on this route. Some of these levels were altered by the improvements made in 1872, especially near the summit, and might be still further improved by raising the waters of Lac des Milles Lacs and Shebandowan so as to lengthen the navigable reaches and avoid construction of locks in that portion of the route.

Of the character of this section of country and its suitability for navigation, Dawson, in his report of 1868, writes:—

"Westward of the Height of Land on the streams tributary to Rainy Lake there is a section of country remarkable from the fact that a very considerable portion of its area is occupied by lakes. Those on the various routes which have been followed are set down on the annexed map, but these give only a faint idea of their number. Every river and rivulet has its lakes. Go in whatever direction he will, the explorer, on passing over a mountain range, is sure to stumble on a lake. . . So numerous are they that it would be difficult to say whether the country would be better described as one vast lake with ridges of land running through it, or a land intersected by water. . . . Such a region is but ill-adapted for railways, but nature has made up for the deficiency by providing such means for canals as rarely exist. Between the hills and the mountain ranges there are long reaches of tranquil water, which could be connected together by means of lock and dam, with but little excavation. . . . A very marked characteristic of the region is that the streams are not subject to sudden or considerable floods, and this is a feature which the engineer who has to provide for waterworks of whatever description will look upon with unmixed satisfaction. . . . The lakes are everywhere studded with wooded islands, and so sheltered that the smallest canoes are seldom windbound."

And in his report of 1869;—"Between the Height of Land and Rainy Lake the lakes are so numerous and so large that it would be difficult to say whether land or water predominates. The lakes, however, afford the means of making a very good water communication at a moderate outlay.

"From Fort Frances to the north-west angle of Lake of the Woods

the navigation is uninterrupted, save by two little rapids (Manitou and Long Sault), easily overcome."

It is quite evident, therefore, that on the section between Lake Shebandowan and the north-west angle a navigable route can be opened at a very moderate expense by following the old Dawson Route.

Recent discoveries, however, of large gold-bearing districts along the Seine river, and immense deposits of high grade magnetic iron ore on the Antikokan river, render it advisable to seek an outlet in this direction from Rainy Lake to Lac des Milles Lacs. This latter route was also examined by Dawson, but abandoned for the one bearing his name for certain reasons which may not be applicable now. In his 1869 report, he says:—

"Two routes have been followed from Lac des Milles Lacs, one by its discharge, the River Seine, and the other by the old Canoe Route. . . . Either route can be made practical in the manner I have recommended for the Seine, at a moderate outlay, but, after duly weighing their respective advantages, the old Canoe Route will be, both as to economy of work in rendering it available, and facility of managing and navigating it afterwards, the best."

The amount of local traffic, however, which would now be tributary to the Seine River route, and the assistance its improvement would give in developing this rich district, point to the necessity of further examination, with a view to its possible adoption in ·e of the Dawson Route, for the business it would develop compared with the other would perhaps warrant a larger expenditure to open it up. In distance, too, the Seine River route has a slight advantage over the Dawson. Between two common points, Fort Frances and Brule Portage, the distance by the Dawson route is ?? miles, and by Seine river 125 miles. In this 125 miles there re four miles longer sailing through the deep water of Rainy Lake an by the other route, all of which helps to shorten the time of e through trip. The Seine river route is entirely through Canadian erritory, while a portion of the other passes through the rivers and kes on the boundary, and in adopting the latter we would open p American territory at our expense. For these reasons, therefore, the Seine river route should be carefully examined, and adopted f at all feasible.

In addition to its other advantages, a large revenue would no ubt be obtained from the mines because of the power which can e developed at the various falls and transmitted by electricity for e in them, and in tramways connecting them with the canal.

At Fort Frances the Dominion Government has already constructed a basin for a canal and lock to overcome the 23 feet fall in ıe Rainy River at Couchiching Falls. This basin is 800 feet in

length, and the lock 200 ft. by 36 ft., with 7 ft. of water on the mitre sill. This work was commenced in 1875, and stopped in 1879, when it was reported to be ready for the lock gates. Nothing appears to have been done to it from that time until the present, but it is understood that the Government is now about to complete it, and also the work of removing boulders and obstructions at the Manitou and Long Sault Rapids on Rainy River.

The next section to consider is that between Lake of the Woods and the Red River. There are four routes by which this connection could be made; (1) the Winnipeg River; (2) the Rousseau; (3) the north-west angle to Winnipeg via Seine River Valley; and (4) that via Reed River, Whitemouth Lake and River and the Seine Valley.

In choosing the best location for this section of the route it will be necessary to take into consideration the navigable connections west of the Red River. It should be located, not necessarily on the cheapest line for construction, but on the most direct, for saving of time in passing through the canal to Lake of the Woods is of greater importance and represents a greater saving in transport charges than the interest on additional capital expended in first cost of construction. It is very probable, however, that in this case the shortest route will be found to be the cheapest to construct, and without doubt the cheapest to maintain and operate. For these reasons the two last-named routes (3) and (4) only will be considered. They form the most direct route to the mouth of the Assiniboine river, which may be considered the trunk line of communication from the west, because upon it can be converged water routes traversing for hundreds of miles the most productive and thickly populated portion of Manitoba and the North-West Territories.

Route No. 3, from the north-west angle of the Lake of the Woods, is about 101 miles in length, and the fall to the Red River is 337 feet. The first 24 miles from the north-west angle passes through a low, swampy country, which is comparatively level, so that it may be found possible to excavate a channel without locks connecting with the Whitemouth river. This river would then be followed for six miles to the line between Ranges 12 and 13 east of the Principal Meridian. Thence the route would follow a direct line by lock and canal, 27 miles to the Seine River, concluding with 44 miles through the Seine River Valley to its junction with the Red River at Winnipeg.

Route No. 4, via Reed River, will have Buffalo Bay as its harbour on Lake of the Woods. Entering the Reed River the course of that stream is followed for several miles, thence to Whitemouth Lake, and passing through it and Whitemouth River to the point where

Route No. 3 strikes that stream; from that point to Winnipeg it will follow Route No. 3. This route will be some eight miles longer than No. 3, but it may prove much cheaper to build, following as it does the courses of rivers and lakes to a greater extent. The sailing distance across Lake of the Woods is, however, about 14 miles shorter to Reed River than to North-West Angle; thus giving a saving in distance from the mouth of Rainy River to Winnipeg of 6 miles in favor of the Reed River route, No. (4).

The construction of a canal across this portion of Manitoba will drain a large section of the Province, which is now almost impassable, owing to the numerous swamps which cover its surface. It has a considerable growth of timber suitable for fuel, lumber and railway ties, which would find a ready market in Winnipeg, where it could be delivered very cheaply on barges, but which is now inaccessible to it, owing to the high cost of transportation.

Dr. Dawson, of the Geological Survey, describes part of the district as follows:—"That part of the country east of the 6th Range of Townships is more or less swampy, with occasional tracts of dry land; these swamps and muskegs are as a rule very shallow, and might be easily drained. The water shed dividing this section of country from Lake of the Woods is within a few miles of that Lake, and is only 12 feet above it. There is a fall from the water shed to the western limit of this section of 220 feet, but a very small proportion in its present state is fit for tillage, though if drained at least one-half will be found to have a rich and productive soil, in many places equally as good as that west of Red River. The chief present value of the region, however, seems to be as a reserve for fuel and timber for construction for the more fertile land bordering the Red River."

This is the final link to connect Red River with Lake Superior, and an examination of the profile will show the amount of lockage to be overcome, and the general character of the route. It has been shown from the testimony of competent men that it is an entirely feasible route, and that it has an abundant supply of water at all summit points for the operation of locks sufficient to carry a very large traffic; that it will give easy access to immense mining and timber districts; that it will be a reasonably cheap route for construction, as in the total distance of 453 miles, 305 miles are now navigable streams or lakes, and only 148 miles, one-third of which follows natural water courses, requires canalization. It will furnish numerous water powers to grind wheat in transit, and it is reasonable to assume that at such points flourishing communities will be established, as has been the case at similar places on the Erie, Welland and St. Lawrence Canals.

The open season for navigation over this route is given in the

Public Works Report for 1882, as extending from May 15th to October 20th; but in the same report, page 651, an account is given of the transportation, late in the Fall of 1871, of Wolseley's Expedition, a fact which is still fresh in the minds of many Manitobans:—

"The force assembled in Collingwood on October 20, and reached Lake Shebandowan on the 26th, the first detachment of boats leaving there at midday on the 27th. The season was very far advanced, some of the boats and steam launches had been laid up for the winter, and thin ice had formed on some of the smaller lakes. But by great exertions the force was hurried through, and arrived within 10 miles of the North-West Angle on the 12th of November. Here the ice had formed so solidly that it was impossible to get the boats through it, and the men had to march to the shore over the ice."

Now, if such an undertaking could be accomplished at this late season, when there were no boats moving to keep a channel open, can it be doubted that a fleet of boats, continually moving over the route, propelled by steam, would without difficulty keep it open until the 15th of November at least, which is within a few days of the closing of navigation on the St. Lawrence east of Montreal. The Erie Canal is by such means frequently kept open a week or ten days after neighboring waters are frozen up. The Sault Ste. Marie Canal is usually open from May 3 to December 3, so there would be only 18 days' difference in the open season between it and this proposed water route; but it is eighteen days of very valuable time, and if there is the same rush on the water route during this period as there is on the Canadian Pacific Railway to get the grain forward before close of navigation on the Lakes, the open season on it may, in most seasons, be still further prolonged.

Feeders from the West.

Having described the possible routes for a continuous waterway between Winnipeg and Fort William to serve as an outlet from the prairie country to the Lakes, attention will now be directed to the wonderful system of rivers and lakes that traverse all parts of the Western country, and an endeavor will be made to show how they can be united to form a vast system of waterways, reaching out for hundreds of miles north, south and west, penetrating the most productive and thickly populated portions of the Province and Territories. Such a system of waterways would furnish feeders to the outlet described, just as the network of railways west of Winnipeg now serves as feeders for the railway outlets to the east and south. But they would be vastly more valuable than a line of railway, as their capacity for the transportation of grain and heavy bulk cargoes would be several times over what any single line of railway could

carry, while profitable freight rates over them should bear about the same proportion to railway rates as they do in other countries.

The Red River.

This river is now practically navigable from a point considerably south of the International Boundary to Winnipeg, but it would no doubt require improvement at some points to make it suitable for general use. It should attract considerable traffic from the northern part of the state of Minnesota, as well as from southern Manitoba, and it should have a considerable influence over traffic rates from the Mennonite settlements, one of the largest grain-producing districts in the Province.

By the extension of the railway lines of Southern Manitoba to the river banks and the establishment of elevators for transferring cargoes to barges, the rail haul would be reduced to a minimum, quick return of cars to congested points would be possible, and the result would be beneficial alike to producers and railway companies. The latter particularly should benefit by such an arrangement, as the present equipment of cars and engines would be more regularly employed in hauling paying loads, while the unprofitable business of hauling long trains of empty cars from Fort William or Duluth as far as Red River points in Manitoba would be avoided. Grain trains unloading at river ports would very soon get return loads of lumber and bulky freight for interior points, for it is tolerably certain that on completion of the canal between the Red River and Lake of the Woods, the principal lumber industry of the Province would be established on the river, and St. Boniface would be to Manitoba what Tonawanda is to the State of New York, the great centre for the storing and distributing of the products of the forest.

The Red River north of Winnipeg can hardly be classed as a feeder to the outlet to Lake Superior, but no description of our western waterways would be complete without a reference to it and Lake Winnipeg.

During high water it is now navigated by small steamers to Selkirk, where connection is made with the larger steamers sailing on Lake Winnipeg. The only obstruction on the river which prevents large steamers and barges sailing up to Winnipeg is the St. Andrew's Rapids, and to overcome these a somewhat expensive dam and lock are necessary, but the benefits its construction would confer on the chief city of the Province, and a large section of Eastern Manitoba would fully warrant the necessary outlay. It would give an immense impetus to the speedy development of the great natural resources of Lake Winnipeg. In connection with the western system of waterways about to be described, it might bring the iron ores

of Lake Winnipeg and the coke of the Crow's Nest Pass mines within profitable reach of each other, and promote the establishment of iron industries in the Province.

Lake Winnipeg is 280 miles long by an average of 35 wide. Its principal resources are lumber, cordwood, fisheries, which are worked very largely, sandstone and limestone. Iron ore is found on Black Island. Several gold discoveries have also been found recently near Hole River.

The Assiniboine River.

This great river flows directly through the central portion of the Province; it passes the town of Portage la Prairie and City of Brandon; a country rich in agricultural possibilities is tributary to it; and with it tributaries, the Souris and Qu'Appelle, the most thickly populated and fertile portions of the Province are reached. The two latter streams at their lowest discharge have sufficient water to supply all the locks that would be necessary to make them navigable. Their average fall per mile is low, and but few dams and locks would be required on them compared with many streams which have been improved elsewhere. The Assiniboine is the most important of these three streams, and, in the early days of settlement in the Province, it was navigated by large steamers for two or three months in the spring and early summer. It played an important part in transportation as far as Fort Ellice until the advent of the railway, and will do so again when it forms part of a continuous waterway to Lake Superior. It has a large and constant flow, and its low fall of about a foot and a half per mile makes it an easy and cheap stream to convert into a navigable one throughout its entire length to the mouth of the Qu'Appelle at Fort Ellice. There is no doubt that these three streams can be converted into great arteries of trade and commerce at much lower expense than it would cost to construct and equip a single track railway, and, as already stated, their carrying capacity would be considerably greater, as it only requires two barges similar to those in use on the old Erie Canal to carry as much grain as a train of twenty-four (24) cars holding 666 bushels each.

The principal objection which can be raised to the use of these rivers as navigable channels is the excessive distance the present rivers traverse in their course. They are all very crooked, and wander from side to side of their valleys, covering probably from two to three times the distance of a straight line between any two points; but the very same causes of this peculiarity in these streams can be utilized in making them straighter, that is, the solubility of the soil in the valleys, which is extremely susceptible to the action

of water, and is generally speaking free from boulders or hard pan. An ice-jam in spring will sometimes divert the stream from its old bed to an entirely new one, a feature which will render it necessary to exercise care in the selection of sites for dams and locks, and to take precautions to confine the river during its highest flood to proper channel.

By far the greater number of the larger bends in the river can be got rid of by excavating a deep narrow ditch across the neck of and at their base so as to allow the flood waters in spring to pass through it. It is an axiom that water hates angles, and it might be added in this case sharp curves; and one season's flood is usually sufficient to excavate a channel along the line of the ditch through which the whole flow of the river will pass. This method has already been successfully employed at several points on the Assiniboine between Winnipeg and Portage la Prairie, and the writer adopted it to straighten a large bend in that river where it is crossed by the Manitoba & North-Western Railway at Millwood. This plan of straightening the river reduces its length, and consequently increases the current; this, however, would be overcome by the construction of dams where necessary to convert the river into slack water stretches. It is estimated that the length of the Assiniboine River between Winnipeg and Fort Ellice can be reduced from 400 miles to about 300 miles.

The Qu'Appelle River.

From its junction with the Assiniboine to the mouth of Big Cut Arm Creek, the Qu'Appelle River has a width of 70 to 90 feet, and is from 8 to 12 feet deep, with a current of about 1½ miles per hour. From Big Cut Arm to Round Lake its width varies from 70 to 100 feet, and its depth from 2 to 4½ feet, the bed being soft mud, and free from boulders except at the rapids near Round Lake, where it is filled for about 100 yards with large and small granite boulders. Commencing at Round Lake and going west is a succession of lakes, all wide, and varying in depth from 20 to 60 feet, and all connected with water courses, which can easily be made navigable by lock and canal. The total distance from the mouth of the Qu'Appelle to Eye-brow Lake, the most westerly one on the river, is about 254 miles, and the rise is 421 feet, an average of 1.65 feet per mile. About 8 miles west of Eye-brow Lake the height of land is reached at an elevation of 19 feet above that lake. This ridge is all that separates the Qu'Appelle river navigation from the South Saskatchewan, which turns abruptly to the north opposite the lake. The distance from the height of land to the Saskatchewan is about 7 miles, and the descent is about 85 feet.

Between the crossing of the Regina & Long Lake Railway and the Saskatchewan, about 98 miles, there may be some difficulty in maintaining a system of locks and canals, owing to the absence of a sufficient supply of water. A careful survey and study of local conditions may, however, produce some means of solving the difficulty. There is always one way of doing so, if less expensive plans fail, and that is by connecting these two rivers; and the importance of doing so might easily be sufficient reason for adopting it. It will be comparatively easy to open a channel right through the dividing ridge, as its greatest depth, and that for a short distance only, would not exceed 90 feet. The waters of the South Saskatchewan would then flow through the Qu'Appelle Valley, as it is believed they did in past ages, and continuous navigation would thereby be established between Lake Superior and the foot-hills of the Rocky Mountains.

The South Saskatchewan.

The question of the navigability of this great river appears at one time to have been in doubt, but Prof. John Macoun, in his book, "Manitoba and the great North-West," writes:—

"While exploring the great Buffalo Plains in 1879 I was particular to make enquiries regarding the navigation of the South Saskatchewan, and in my report to the Government for that year made allusion to it in the following words:—'We pitched our camp on the hill-top, about a mile and a half from the river. . . . Below us lay the mighty Saskatchewan, rolling its turbid flood between banks 250 feet high, seeming altogether out of place in this arid region. The river at one crossing was 770 yards wide, and the main channel, over which our horses had to swim, was not less than 500 yards. Shoals and sand bars were numerous, but nothing to indicate that the river at this point was unsuited for navigation.'" Prof. Macoun continues:—"Why the south branch should be thought unfit for navigation I cannot understand. Mr. Hind, who passed down this river in August, 1858, never speaks of its depth as being less than seven and a half feet, and the current is never more than three miles per hour, except when close to the north branch. . . . When on the plains I never heard of this river being fordable below the mouth of the Red Deer River. . . . When at the Blackfoot crossing of Bow River, a branch of the South Saskatchewan, 27th August, 1879, I found that it was with the utmost difficulty horses could cross without swimming. No person ever mentions a rapid being anywhere in the river below this, so that I have come to the conclusion that there is nothing to prevent all the supplies wanted for the South-West being sent up the South Saskatchewan.

"Coal is abundant in the river banks at the Blackfoot Crossing,

and further eastward, so that there will be no difficulty as to fuel for steamers. Should the attempt be made to navigate the river it will be found to have better water for a longer period than the North Saskatchewan, as its head waters drain a greater extent of the mountains.

"Further on in the same report I say:—'In my Journal I showed why I believed the South Saskatchewan was navigable, and I now reiterate the statement after a careful review of all said for and against it. When its navigation is an accomplished fact all supplies for the Police and Indians can be taken to within less than thirty miles of Fort Walsh and Cyprus Hills, and those for Fort McLeod landed at the Forks of the Bow and Belly rivers within two short days of the Fort. Here (at the Fort) is abundance of coal (Galt coal mines) so that there will be an ample supply of fuel for all purposes. . . . If the coal deposits can be developed by this means, all the prairie land seen by me will become in the course of years thickly settled with a prosperous population, as there is no physical defect in the country but the want of wood.'"

Assuming then, that, after connecting the Qu'Appelle and the South Saskatchewan rivers, no further obstructions to navigation exist so far as Medicine Hat, 280 miles distant, that point may at first be chosen as the terminus of navigation for convenience of the railway connections. The distance by rail from the Anthracite Coal mines is 257 miles, from Lethbridge 113, and from the Crow's Nest mines 218 miles. The coal shipments to the east can be concentrated at Medicine Hat, and by means of steamers and barges can be delivered at points in Eastern Assiniboia and Manitoba at a cost which will never pay the railways to haul for, but which will be remunerative to vessel men and economical to consumers.

The Souris River.

Not much about this river is known to the writer beyond the fact that it flows through a very fertile and thickly populated part of the Province, and by its means a short railway connection with Estevan and the Souris coal fields may be established. As to the possibility of rendering it navigable for barges, there does not appear to be any doubt. Professor Hind describes it briefly as follows:—"The Souris or Mouse river joins the Assiniboine 140 miles from Fort Garry, by the windings of the river. . . . At its mouth the Souris is 121 feet broad and three feet six inches deep in the channel, and a current of half a mile per hour. . . . Near Snake Hill, 61 miles from the outlet, it is 100 feet wide and four feet deep in the channel. Near the Hudson's Bay Co. house (near Hartney) found extensive deposits of bog iron ore, capped by shell marl

covered with drifted sand. The river is 25 feet broad and very shallow, flowing 20 to 25 feet below the general level of the prairie.'

Prof. Macoun adds to this:—"From the foregoing it is obvious that in general the river is quite deep enough for river steamers, and should the rapids, which are said to exist some distance above its mouth, be found passable, another 100 miles will be added to the river navigation."

Prof. Macoun's idea was evidently confined to the probability of its being navigable without improvement, and it is reasonable to assume that by means of locks and dams navigation may be extended as far as Melita, if not further. From Melita to the Estevan coal mines the railway haul is only 98 miles, so that in addition to regulating the rates on grain from this portion of the Province, its improvement would result in a great reduction in cost of delivering coal in the Province as far east as Winnipeg.

Northern System of Waterways.

Eighteen miles north of the Assiniboine at Portage la Prairie lies Lake Manitoba, 120 miles long and about 24 miles in extreme width.

Among the natural resources of this lake may be mentioned its fisheries, limestone of excellent quality, and, in almost inexhaustible quantity, spruce lumber and cordwood. Gypsum of exceptionally good quality is found in immense quantities about nine miles east of the lake north of Fairford. Lake Manitoba is 14 feet above the Assiniboine river at the mouth of Long Lake, and, by following the course of this last-mentioned lake and its creek to the west, connection from the Assiniboine can be made with Portage Creek, a wide sluggish stream on about the same level as Lake Manitoba. A channel dredged through the bar at the head of Portage Creek will give access to the lake. One lock may be necessary to maintain the level of water in Lake Manitoba.

At Meadow Portage the head of Water Hen river is found the next obstruction. This narrow neck of land separates Lakes Manitoba and Winnipegosis, the latter being about 19 feet above the former; two locks and a channel two miles in length is all that is required to connect these large bodies of water.

Lake Winnipegosis.

This lake is about 100 miles long and 12 to 15 miles wide. Prof. Macoun describes it as follows:—

"The general appearance of this lake is much finer than that of Manitoba, as there is little or no marsh, except at the southern end . . . . Numerous islands are a marked feature, and sandy beaches are much more common than on the other lake. . . .

As we proceeded up the lake the country constantly improved. The shore marshes became less and less, and finally disappeared; in their place beaches of white limestone glittered in the sun, and fine forests came down to the beach. The timber increased in size, and at Pine River spruce of large size were abundant. On the various islands were very large elms, and mountain ash over ten inches in diameter were frequently seen.

"Duck Bay is noted for its brine springs, which are said to be of considerable extent. These are situated between two rivers which issue from Duck Mountain, and are only five miles off; about six miles south of the salt springs in the direction of Mossy River are springs said to be as good as those where the salt is made. Large salt springs occur at a point about seven miles from Water Hen River on the east side of Lake Winnipegosis.

"As we went north the richness and the luxuriance of vegetation increased; the banks became higher, and the forest trees of larger size. Many exposures of rock were noticed around Dawson's Bay. . . . .

"The northern end of Lake Winnipegosis is filled with lovely islands, which are margined with fine drooping elms of a large size. The sail across Dawson's Bay on a lovely day in July reveals more natural beauties than I ever before beheld on our inland waters. Green islands with white sand or gravel beaches, covered with drooping elms or other fine trees; the mainlands rising gradually up from the water, covered with an unbroken forest of tall poplar, intermixing with the gloomy spruce, deep bays backed with the distant forest, and high over all the steep escarpment of the Porcupine mountains form a picture as seen from the Lake which has few equals in any part of the world."

In addition to salt, timber and limestone, this lake numbers amongst its natural resources fisheries of very large proportions second to none in the Province.

Immediately south of Lake Winnipegosis lies Lake Dauphin, with which it is connected with Mossy River. This river is over 100 feet wide, but shallow in depth. The banks are from two to fifteen feet high, which would indicate that no difficulty would be experienced in making it navigable by means of lock and dam. Dauphin Lake is only eleven feet higher than Winnepegosis; it is 30 miles long and 12 wide. It is very shallow, and it would be necessary to dredge channels to reach the shore.

Immediately west of Lakes Dauphin and Winnipegosis lie the famous Dauphin and Swan River districts, and the opening of an inland waterway to their borders would prove of great value to them.

The North Saskatchewan.

Four or five miles north of Lake Winnipegosis lies Cedar Lake, an enlargement of the great Saskatchewan. The water level in each is practically the same, only varying a few feet during flood seasons. The barrier between them is practically a swamp, and the greatest elevation at the lowest crossing is about 43 feet. All that is necessary then to connect our system with Edmonton, 800 miles to the west, is a channel 4 or 5 miles long, with a guard lock to control the waters of the Saskatchewan in time of flood, and to prevent its flowing into Lake Winnipegosis.

In 1882 five large stern wheel steamers were in service on the North Saskatchewan between Grand Rapids and Edmonton. It was navigated with considerable difficulty at some points, owing to the presence of boulders in the channels, as well as several rapids, but it was estimated by competent authorities at that time that for a sum of $50,000.00 most of these obstructions could be removed, and a safe channel be provided. About $30,000.00 was spent on the work by the Federal Government under the supervision of the Hudson's Bay Co. in 1884, so that it cannot require more than twenty or thirty thousand dollars additional to complete the work and make this great river safe for navigation.

The average fall of the river is about 1½ feet per mile; the difference in elevation of Cedar Lake and Edmonton being 1,200 feet.

The country traversed by this river is as yet sparsely settled, owing to its inaccessibility from existing railway lines, which touch it at two points only, Edmonton and Prince Albert. But at both these points large settlements exist, and they are being rapidly filled up. In its suitability to sustain a large population this immense district is second to none in the whole North-West. It is well watered by numerous streams, and has an abundance of timber within easy reach, while its soil is rich and fertile. Lignite coal of superior quality in almost inexhaustible quantities is found near Edmonton, which, by means of this river, could be marketed along its whole length at remunerative rates.

To summarize, it has been shown that, for the purpose of feeders to the canal from Winnipeg East, there now exist west of Winnipeg the following rivers and lakes, which are capable of being improved and connected together as navigable routes for steamers and barges:

Feeders:—	Miles.
Red River	100
Assiniboine River	300
Qu'Appelle River	278
South Saskatchewan to Medicine Hat	280
Souris River	100

Long Lake and Portage Creek	27
Lake Manitoba	130
Lake Winnipegosis	120
Lake Dauphin and Mossy River	45
Great Saskatchewan and North Saskatchewan	800
Connections:—	
Red River north of Winnipeg	45
Lake Winnipeg	280
Total	2,505

These Lakes and Rivers are situated in the most fertile and thickly populated parts of Manitoba and the North-West Territories; they branch out in all directions, like a well-planned system of branch railways.

They touch nearly all the important traffic producing and consuming points now reached by railways, in addition to immense districts still open for settlement, and the announcement that the works necessary to utilize these great inland waterways were about to be commenced, works that are comparatively small in themselves but immense in their results, would mark the beginning of a degree of development in our fertile prairie country surpassing any expectations which have been hitherto entertained.

Dimensions of Locks in Proposed System

This subject will be considered from the standpoint that nothing but a first-class up-to-date system shall be established. No old-fashioned small-dimensioned make-shift canals can compete with the modern railway of to-day. The lessons learned by the failure of the old barge canals to successfully compete with railways must be kept in mind when determining upon the dimensions of canal prism and locks for a water route of such immense importance to the future of our prairie country.

The old syle of canal for barges carrying 100 to 200 tons has had its day, and while it accomplished wonderful things in securing cheap transportation it has been unable to hold its own against the aggressive spirit manifested by the management of the modern railway. Small boats, slow speed and horse flesh are no match for the powerful locomotive and cars of 30 and 40-ton capacity of to-day.

The modern canal, then, must have ample dimensions, and barges must be towed by powerful steamers. The Erie Canal, originally completed in 1836, had only a depth of 4 feet, admitting barges of 75 tons capacity; it cost $7,200,000.00. The first enlargement was commenced before the original canal was fully completed. It was

enlarged to 7 feet in depth, admitting barges of 240 tons capacity, and cost $44,500,000.00. This was completed in 1862. A second enlargement is now under way, increasing the depth of water to 9 feet, and admitting barges of 400 tons capacity, the estimated cost of which is about $23,000,000.00. The total expenditure for construction on this canal, when the present plans are completed, will be close on 75 millions. The former cost of 52 millions was more than repaid to the State of New York in tolls and reduced freight charges, and since 1883 the canal has been free of tolls. It is claimed that during the past 30 years over 200 millions of dollars have been saved in transportation charges on grain alone shipped through this canal. The lesson to be learned from the experience of the Erie Canal, and a similar one from the history of our own Welland and St. Lawrence river canals, then, is to build our proposed canal of sufficient dimensions to admit barges carrying not less than 400 tons, to avoid the necessity of enlargement for many years to come, and the resulting increased cost which such work entails.

A depth of 9 feet of water will be required for boats of this capacity, and this is probably the maximum depth that can be obtained upon the rivers west of Winnipeg, and, while a greater depth can be obtained throughout the portion of the system east of Winnipeg, it may be considered advisable to maintain a uniform depth throughout the whole of the proposed system west of Lake Superior, and 9 feet will therefore be taken as the ruling depth of water.

It is customary on the Erie Canal for one steamer to haul three barges. The locks should therefore be built to pass two boats in tandem; and the boats would each be about 115x17½x8 feet. This general plan should be followed throughout the whole system, so that steamers on the rivers west of Winnipeg can pick up their tows at various loading points, and continue their journey through to Fort William without interruption.

Time consumed in Passage.

For this purpose Winnipeg will be considered the concentrating point for barges going east or west, as it now is for the cars on the railway systems, and the estimated time for a steamer and three consorts to sail to Fort William and return will be used as a basis to estimate what it should cost to transport a bushel of wheat or ton of merchandise between Winnipeg and Fort William by water. To arrive at these figures the present practise and expenses on the Erie Canal as used by Major Symons (see 1897 report on the proposed ship canal between the Great Lakes and Hudson River) for estimating charges on the enlarged canal will be made use of, as they

fairly represent conditions which will be found similar in general respects on the Winnipeg-Lake Superior route.

The distance from Buffalo to New York is 504 miles, and from Winnipeg to Fort William 453 miles. The former consists of 350 miles of contracted canal, and 154 miles of deeper and wider water in Hudson River. The latter consists of only 148 miles of contracted canal, and 305 miles of deep rivers and lakes; but the advantage which this gives to the Winnipeg-Lake Superior route in sailing time over the Erie will be partly counterbalanced by the increased lockage on the former. It will be fair, then, to assume that the time required by a four-boat fleet to make the round trip between Winnipeg and Fort William will at least not exceed that required between Buffalo and New York. Major Symons estimates that on the enlarged Erie Canal a fleet will make 9 to 11 round trips per season, but on account of the shorter season here one trip will be deducted, making the average, say, 9 trips, depending on the business management and despatch at terminals.

Estimated Expenses of Four-Boat Fleet (Symon's Report).

"Fleet 1 steamer and 3 consorts—1st class.—Steamer carries 300 tons, or 10,000 bushels; each consort 400 tons, or 13,333 bushels each. Fleet loaded, 1,500 tons, or 50,000 bushels by 9 equals 13,500 tons, or 450,000 bushels.

"Return freight, 1-3 loads miscellaneous, 4,500 tons, charges at Buffalo 1.3c per bushel of wheat. Estimated transfer charges at Buffalo 25c per ton on return freight."

(As similar transfer charges must be provided for at Fort William and Winnipeg, these figures will be used, but it should be possible to reduce the Buffalo charges to 2c per bushel, and give a good margin of profit for transferring from barges to Lake steamers, or 1c per bushel for transfer and 3 or 4 days' storage in elevators.)

"Steamer value	$10,000 00	
Three consorts	10,500 00	
		$20,500 00
"Season's Expenses:		
Wages and subsistence of crews		$ 3,174 00
Fuel, oil and waste		1,962 50
Ordinary repairs		225 00
Insurance on fleet		255 00
Insurance on wheat		1,012 50
Interest on investment at 6 per cent		1,230 00
Depreciation, etc., at 6 per cent		1,230 00
Miscellaneous		150 00
		$9,239 00

"*Transfer Charges:*

On 450,000 bushels wheat at 1.3c	5,850 00
On 4,500 tons of up freight at 25c	1,125 00
	$16,214 00

"Assuming return freight reduced to wheat, there would be 450,000 plus 150,000 equals 600,000 bushels of wheat carried, and the cost of transportation, including transfer charges, would be 2.70c per bushel, or 90c per ton."

As all the items making up the expense of $16,214.00 per season are very similar to those which obtain here, with the exception of coal for steamers, it should be possible to establish a rate not exceeding 3c to 3½c for carrying a bushel of wheat by water from Winnipeg to Fort William, and load it on Lake steamers.

The present rate by rail is 15½c per 100 lbs., or 9½c per bushel. The difference of 6c per bushel on 30 million bushels of wheat, which we will soon be exporting, represents an increased return of $1,800,000.00 per annum to the farmers of the North-West on this item alone—or capitalized at 4 per cent., a sum of $45,000,000.00, which is probably in excess of what it would cost to build the whole system of waterways that has been described.

On coal the freight by rail is now $3.00 per ton Fort William to Winnipeg. By water is should not exceed $1.00.

On lumber the freight by rail from Rat Portage to Winnipeg is $3.00 per 1,000 feet B. M. By water it should not exceed 60 cents per ton, or 40 cents per 1,000 feet B.M.

From the coal mines of the West and the forests of British Columbia, upon which we already draw largely, and would be glad to draw still more largely, for our supplies of fuel and lumber, similar results in reduction of freight rates may be expected. By means of the Ohio and Mississippi rivers coal is carried from Pittsburgh to New Orleans, 1,970 miles, at an average cost of 71 cents per ton. Why should we not get our coal from Lethbridge, Crow's Nest Pass and Anthracite by rail to Medicine Hat, transfer it to coal boats similar to those used on the rivers mentioned, and which are sold for the lumber they contain at New Orleans, and secure the same rate for towing on the Saskatchewan, Qu'Appelle and Assiniboine rivers to Winnipeg, much less than half that distance?

Further comparisons might easily be made, but enough has been shown to illustrate the immense benefits which may reasonably be expected upon the opening up of this wonderful system of waterways, which is our national heritage; and the influence which it would bear upon the building up and development of our great Western country it would be impossible to over-estimate.

Canal Dues.

No allowance for canal dues has been made in the foregoing estimate for transporting wheat, coal and lumber.

This is a question which is open to discussion, and it is not intenced to enter into it very fully here. But when we consider what a vast amount of money has been granted to aid the construction of private railways in the North-West, and is still being granted for extensions of our splendid railway systems, is it unreasonable to suggest that an equally liberal policy might be adopted in connection with the waterways. Over 44 per cent. of the paid-up capital of Canadian railways has been granted to them by the Federal and Provincial Governments and Municipalities.

The United States gives practically no public aid towards the construction of railways now, but spends millions annually in improvement of its inland waterways, which are free to all.

France, with over 8,000 miles of canals and improved rivers, abolished all tolls in 1880.

The State of New York abolished all tolls on the Erie Canal in 1883.

Having created the railways, we must now create something more effective than statutes to control them, and there is nothing that will do this more thoroughly than free waterways.

Having described a possible system of connected navigable waterways between Lake Superior and the far west, consisting of a main outlet east of the Red River, and a system of feeders throughout the west, branching out into all the important producing districts, the scheme, as outlined, will now be considered from the following standpoints:—

The Economic Results of the Extension of Waterways, and its Influence on Railways and Freight Rates.

These points have been very ably dealt with in a Monograph on Inland Waterways by Emory R. Johnson, published by the American Academy of Political and Social Science in 1893, and the writer cannot do better than conclude this paper with some extracts from this source.

"The influence of canals, improved rivers and lakes, as regulators of railroad tariffs, is a subject of interest alike to those countries whose railways are under private ownership and management and to those which themselves own the means of transportation. The control of rates on private railroads has presented to legislators a problem they have as yet been able only partially to solve. After sixty years of effort on the part of the English Parliament, first to

prevent combination, then to secure reasonable rates, England has the highest railway charges of any country. The establishment of maximum rates by law is no guarantee of moderate charges. In this country the attempt to control rates by rail led to the vigorous attack of the Western States against the railroads by means of the "Granger legislation." This policy was soon abandoned, and the State railroad commissioners were given wider powers and increased functions. The State commissions having no power to lay down rules concerning charges on inter-state commerce, the national commission was established in 1886, with power to supervise interstate traffic, and to compel revisions of rates when charges are unreasonable, or when they are unfair to particular shippers. All this is evidence that some control over the administration of private railway companies and some regulation of their tariffs are considered necessary. The results of the commissions' efforts, whatever may be said of their value, and they are indeed important, have in no sense solved the question of rate charges.

Only the threshold of the problem has been reached, and the investigations of the commission have only enforced the need and importance of inland waterways to set limits to railroad charges, and to exercise a constant pressure in the direction of cheaper rates and more efficient service.

"There is a vital difference between the railway and the public waterway. The lakes and large navigable rivers of every country are public highways accessible to all. Any shipper who will may navigate them with his own boats, and at present usually without payment. Canals owned by the State are likewise highways, either free or toll, and those owned by corporations or individuals are usually, at least in theory, ways on which individual shippers may compete. With the railway it is different; the conditions necessary to its successful management have, at least up to the present, prevented its being a highway open to the common use of individual shippers. As is well known, the railway was at first supposed to be of the same character as the turnpike. The first laws, both in England and in the American States, were framed with that idea in mind. It was not long before the error was discovered, and in 1839 the fact of the inability of individual shippers to compete on a railroad by running their own cars and trains was definitely recognized by Parliament.

"Another truth, and one of greater significance, began to manifest itself early in the history of railroads, viz., the fact that combination and monopoly, and not competition, is the natural law governing the relations of railways to each other. This law was not so easily comprehended as was the fact of the difference between the railway and the turnpike; indeed, there are still many to-day who

fail to comprehend the monopolistic character of railroad business. It may be said, as a general statement, that the chief aim of legislation for the control of railway charges has been to maintain competition in a business which is by nature monopolistic.

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"A few persons early discovered the real nature of the railway. As early as 1836, Mr. Morrison, a man whose voice on later occasions was often heard on railroad questions, made a speech in Parliament that can be read with profit even to-day. 'Suppose,' he said, 'that in spite of all the difficulties opposed to the formation of a new company, one is formed, obtains an act, and actually comes into competition with the present line, would not the obvious interests of both parties, unless prevented by such precaution as I have proposed (periodical revision of rates by the Government), inevitably bring about some understanding between them by which the high charges would be further confirmed, and all chances of competition removed to a greater distance.'"

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"The tendency towards combination is equally strong in the case of railroads and competing private waterways, and unless prevented from so doing, they will unite to secure higher rates. In England this was observed by Parliament to be the case as early as 1840, and the subsequent struggle of the two agents of commerce furnished ample evidence of the strength of the tendency. The English railroads usually bought the canals, because they wanted to control rates, and seldom because they wished to use the waterway for moving freight. The chief purpose of English legislation, since 1872, has been to stop the destruction of the canals by the railroads, and, by keeping the waterways independent, to preserve them as regulators of freight tariffs.

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"The best regulator of railroad rates is the independent waterway. Competition between railroads and water routes is quite different in kind to that of railroads with each other; it is bound to produce cheaper rates, and can do this without detriment to the railroads.

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"There is abundant evidence showing the power of water transportation to lower freight rates. The past and present opposition which the railroads have shown the waterways in order that rates might be controlled indicates clearly enough that the railroads are conscious of the potency of water competition. The railroads see

in the waterway an agency which can move certain kinds of freight at lower rates than they can be transported on land; and without analyzing the results of this to see what the secondary effects on the freight business by rail of the cheaper transportation charges for these certain kinds of goods, the railroad strives to quash the waterway out of existence. The success of the railroad companies of England, of Pennsylvania and of Ohio in this regard has been noted.

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The cheapest freight rates by rail to be found in the world are those for grain between Chicago and New York, and why ? Because the cheapest inland water transportation rates in the world are those between the same points. All the railroads of the United States have been steadily lowering freight charges during the past twenty years, and largely, of course, because improvements in track and equipment have made this possible. Those roads, however, that have made the most improvements and the greatest reductions in rates are the great trunk lines leading into New York from the West, those that compete with the great Lakes, the Erie Canal and the Hudson River. The average freight earnings per ton mile of all the railroads of the United States for the year ending June 30, 1890, were .941 cents. The ton mile earnings on the New York Central and Hudson River Railroad were .730 cents, and on the Pennsylvania Railroad, .661 cents; on the Lake Shore and Michigan Southern, .653 cents, and on the Michigan Central, .726 cents; whereas the average earnings per ton mile on the Chicago, Milwaukee and St. Paul, and the Chicago and North-Western, roads coming but slightly into competition with the Great Lakes and other waterways, were 1.06 and 1.03 cents respectively. The following table, showing the wheat rates per bushel from Chicago to New York for the years 1870, 1880 and 1889, by water, by water and rail combined, and by rail, indicates very plainly how freight rates have fallen, and how this movement has been led by the waterways:—

	By lake and canal.	By lake and rail.	By all rail.
1870..	17.10 cents.	22.0 cents.	33.3 cents.
1880..	12.27 "	15.7 "	19.9 "
1889..	6.89 "	8.7 "	15.0 "

"The important influence of the Erie Canal on freight rates has often been emphasized; only a few facts need be given here. They are for the year 1891:—

"The Erie Canal was opened in May, at which time the pool rates on grain from Buffalo to New York were *seven and four-fifth cents*

per bushel. The grain rates on the canal for the various months of the season were, May, 2.51 cents; June, 2.53 cents; July, 2.68 cents; August, 3.94 cents; September, 4.19 cents; October, 4.44 cents, and November, 4.13 cents. The railroad pool rates, though nominally unchanged, were not maintained. Mr. Edward Hannan, Superintendent of Public Works, New York, says:—'My information on that subject, which has been received from private sources, is that contracts were made by the various railroads to carry grain in the months of June, July and August, for four cents a bushel; September four and one-half; and October five cents.'"

"On petition of the Merchants' Exchange, of Buffalo, the Superintendent of Public Works kept the canals of New York State open five days longer than the allotted time. This shows very plainly that shippers regard the canal as a freight regulator. When the canals closed for the winter, the railroad charges again rose to the pool rates.

"Of course, the Great Lakes and the Erie Canal, though very important, constitute only one of the waterways that compete with the railroads of the United States. On the Mississippi River and its numerous long branches there is an immense traffic, setting limits not only to the charges on freight by rail carried up and down the valley, but also to a large extent on that carried out of the valley. The grain rates in 1888, from St. Louis to New York, changed from ten cents a bushel in September to twenty-nine cents during December and January, when the Mississippi River was closed to traffic.

"These great natural waterways exercise the most important influence of any of the inland navigable routes of the United States on the charges which railroads make; but the smaller streams are not without their effect. Whenever the improvement of a stream has given shippers a choice of means of transportation, the freight rates on the articles having such option have been cheapened.

"One of the questions which the Senate (Cullom) Committee on Interstate Commerce sent out in 1885 when making the investigation which preceded the framing of the bill establishing the Interstate Commerce commission was:—'In making provision for securing cheap transportation, is it or is it not important that the Government should develop and maintain a system of water routes?' The answers to the question, and the testimony before the Committee, embodied the views of ninety men, most of whom were eminent in railroading and the transportation business; and seventy-three out of ninety agreed in regarding 'a national system of internal water communication as the most certain and effective method of regulating railroad rates, and of insuring to the people the advantages of cheap transportation.'

"The total volume of freight by rail within the United States and

every other country is, of course, much larger than that by water. The reasons why this is now so, and will continue to be so, were noted in discussing the traffic in the Rhine Valley. The waterways, however, can regulate rates by carrying only a fraction as much as the competing railroad; and it by no means proves the inability of the waterway to fix rates to show that the volume of freight passing over the railroads is several times that on the competing routes of navigation. The rate charged by the waterways sets a limit—not so low, it is true, as the tariff on the waterway—beyond which the railroad cannot go without surrendering its traffic to the waterway. The traffic will bear only a much more limited rate by rail when transportation by water is possible.

"A well-informed engineer, John L. Van Ornum, Chief Topographer of the International Boundary Survey, which has just been made between the United States and Mexico, says:—'It is the universal experience in America that water communication tends to keep down railway rates. Instances are not rare where railways have carried freight for the same rate that competing boats have done until the boats have been sent away or sold on account of lack of business, and then at once the railways have raised their tariffs. In all the number of instances I know of, when water navigation has been resumed, the competing railways have been obliged to lower their rates. Herein lies the great value of our waterways, not so much in actual tonnage carried, as in their far-reaching indirect effect in forcing down railway rates.'

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"No one, it is to be hoped, will interpret the foregoing discussion to imply that the small, ill-equipped, antiquated canals constructed three-quarters of a century ago, to meet the requirements of the commerce of that time, can exert any important control over railroad traffic. The waterways which have such power are those that more or less fully meet the requirement of the commerce of to-day.

"Furthermore, in order for inland waterways to control the charges on private railways, they must be independent of the ownership or control of the railroads. From the experience of the English canals, it is not to be expected that the freight rates by rail in that country are much influenced by the waterways. There is, in fact, but little competition, and the result of this is a very high rate of charges. The average ton-mile rate on the railways of the United Kingdom for heavy traffic is nearly double the average freight earnings of the railways of the United States. This difference is to be accounted for partly by the existence in the United States of great

masses of raw products, which are carried long distances; but more by the fact that a large part of these products may be carried either by water or by rail.

"The conclusion to which the Cullom Committee came as the result of its investigation in 1885 on the effect of water competition upon railroad charges is in perfect harmony with the position taken in this discussion. The report to the Senate was that 'The evidence before the Committee accords with the experience of all nations in recognising the water routes as the most efficient cheapeners and regulators of railway charges. Their influence is not confined within the limits of the territory immediately accessible to water communication, but extends further, and controls railroad rates at such remote and interior points as have competing lines reaching means of transport by water. Competition between railroads sooner or later leads to combination or consolidation, but neither can prevail to secure unreasonable rates in the face of direct competition with free natural or artificial water routes. The conclusion of the committee is, therefore, that natural or artificial channels of communication by water, when favourably located, adequately improved, and properly maintained, afford the cheapest method of long distance transportation now known, and that they must continue to exercise in the future, as they have invariably exercised in the past, an absolutely controlling and beneficially regulating influence upon the charges made upon any and all means of transit.'

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"*Influence of Inland Waterways on Railway Revenues.*

"The relationship between waterways and railroads as freight carriers is but half expounded by showing that inland navigation is the most important regulator of the railroad charges for the transportation of several important categories of freight; it still remains to investigate the effect which this lowering of charges has on the net receipts of the railway companies. If net profits of the railroads are seriously cut into by the competition of waterways, the results can hardly avoid being injurious to the best development of the means of transportation and communication. Although it is doubtless true that in special cases the railroads, by means of monopolistic powers, secure an unduly high rate of gains, this can hardly be said of the railroad business in general. It would be unfortunate, both for the public and for the railroads, were the Government or any other agency to inaugurate a policy that would lessen the returns on capital invested in railroads. It is to the interest of the public that railroad capital should return good profits, in order that railway companies may continue to pay their employees well for their

work, that the companies may be able to improve the service rendered the public, and to extend their system of roads to every nook and corner of the country. The State can have no object in restricting the freest development of the railroad. The interests of passengers and shippers ought to be guarded by careful legislation, but to disregard the interests of the railways in so doing is to commit as grave an error as to neglect the welfare of those who ship goods or travel by rail.

"Water competition is not ruinous, but helpful to the railroads. If waterways be extended, and their regulative power over rail rates be increased, they will prove no hindrance to the development of the railroads. This statement may seem somewhat paradoxical, but is, in fact, not at all so. The two means of communication are very different agents of commerce; they compete with each other for the carriage of several kinds of traffic, and with sufficient force to influence strongly the charges by rail; but the waterway does more than compete; it both aids and complements the railroads. This fact cannot be too strongly emphasized. It must be kept in mind throughout the consideration of the relation of waterways and railways. The two means of transportation do not perform the same work, but services that are largely distinct and complementary to each other.

"Not all the freight transported by water would be moved by rail if the waterway did not exist. Canals, rivers and lakes create a large share of their traffic. The cost of transportation determines to a large extent the amount of goods shipped. Cheaper rates give to existing categories of freight a larger and wider market, and introduce into commerce new articles, such, for instance, as sand, stone, straw, fertilizers and wood, which were formerly unable to bear the costs of transportation. Again, the waterway creates traffic for the railroads as well as for itself. It makes raw materials cheaper, increases the number of those that are available for use, and thus adds to the products of agriculture and manufacture seeking transportation. The effects of increasing and cheapening raw materials are complex; cheaper wholesale and retail prices, and higher wages are possible, and these in turn prepare the way for a larger and more varied consumption of goods. This means important additions to the shipments, especially of manufactured goods, the kind of freight which from its nature falls mainly to the railroads.

"The statistics of the traffic of the railways and waterways at Frankfort-on-the-Main, before and after the canalization of the Main from Mayence to Frankfort, show in a striking way that an increase in water traffic may be accompanied by an equal or greater rise in the traffic of competing railroads. The improvement of the Main from Mayence to Frankfort was completed at the close of

1886. The following table gives the tonnage by rail and by water for the three years before and for the three years succeeding the canalization of the Main.

	Traffic on waterways and railways. Tons.	On the waterways. Tons.	Increase over previous year.	On the railways.	Increase over previous year.
1884.....	1,014,518.7	150,513.7	.....	864,005	.....
1885.....	1,047,345.0	150,805.0	281.3	897,040	33,035
1886	1,088,046.8	155,956.8	5,151.8	932,090	35,050
Average of the 3 years ...	1,050,136.8	152,425.2	.....	897,712	.....
1887.....	1,373,690.8	360,062.8	204,106.0	1,013,628	81,538
1888.....	1,748,733.1	516,798.1	156,735.3	1,231,935	218,307
1889*.....	1,911,758.4	577,610.4	60,812.3	1,334,148	102,213

"The table shows that the total increase of the tonnage of 1888 on that of the average for the years 1884-85-86 was 698,596 tons; by this increase the waterways gained 364,373 tons, and the railways 334,223 tons. The gain of 1889 on that of the average for the years 1884-85-86 was 861,621.6 tons; and in this instance the railways show greater gains than do the waterways. The waterways and railways increased their tonnage 425,185.2 and 436,436.4 tons respectively. The great gains in the tonnage of the railroad since the canalization of the Main as compared with the gains before is seen if the yearly increase be noted.

"Was this increase in traffic due to other causes than the canalization of the Main, and could it have taken place without the waterway? If so, the entire increase in freight might have been secured by the railroads. According to Consul Puls, of the Chamber of Commerce of Frankfort, the products of the interior, such as wood, loam and building materials, secured a greater market through the canalization of the river. The industrial activity of Frankfort increased because of cheaper raw materials, especially coal. The amount of traffic from Frankfort to the sea was greatly enlarged, by rail and by water, and the railroads profited both by a growth in their freight and by an equalization in volumes carried up and down from the sea to Frankfort. This equalization was an advantage to the

*(The relative decline in the increase of the tonnage both of waterways and railroads in 1889 was due to a strike. The increase of the railroads in 1890 was again large.)

railroads, because it enabled them to run fewer empty wagons, and thus to reduce the expenses of operation.

"An important consideration, and one that has not received due attention, is that much of the freight taken from the railroad for water transportation involves little or no real net loss to railway companies. Railroads, especially the American, are doing an immense amount of business which brings them little or no direct profit. Operating expenses constitute a large share—sixty-seven per cent.—of earnings, and this is because a great deal of bulky freight is carried at a rate so low that the costs of operation often include ninety per cent. of earnings. Indeed, it is asserted that coal, coke, stone and iron ore are sometimes carried at a loss by the railroads in order that by so doing they may keep down the prices of crude products, and thus sustain industry and enlarge the volume of higher grades of traffic. The operating expenses on the German railroads constitute only fifty-five per cent. of the gross earnings. Were the American railways to give over a good share of their bulky freight to the waterways it would not materially reduce their net profits. Grain is another article of transportation on which the railroads make only small profits. Grain rates are much lower in America than in Germany, but local freight tariffs are much higher. American railroads are making the local freights pay for the trouble of handling grain at low profit.

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"The increase and extension of waterways aid the railroads through the increased travel which results from building up manufactures, developing trade, and promoting the growth of large cities. Take, for instance, the influence of that greatest of all inland waterways, the Great Lakes, on the growth of the passenger traffic in the States bordering the lakes. It has been, in large part, the improvement of the harbors and channels of the Great Lakes that has caused the phenomenal growth of Duluth, Milwaukee, Chicago, Detroit, Toledo, Cleveland, Buffalo, etc. The railroads have not only aided the growth of these cities, but have in turn been greatly benefited through the development which has come to them by means of the improvements of the water route. Indeed, the most important rail road systems of the United States are those which share in the commerce of the region round about the Great Lakes.

"This fact reveals the true relation of the two agents of commerce. They are complements of each other. When the waterway and railroad are perpendicular, they feed one another; when they run parallel, competition results in reciprocal development of each—at least, will so result when the waterway corresponds, as to dimensions and equipment, to the commercial needs of the present,

and provides for the transportation of goods through comparatively long distances. The Rhine Valley, as well as our own Lake region, furnishes an illustration of this truth. The statistics of the traffic during the last forty years on the Rhine River and on the railroads of the Rhine Valley show that the growth of the transportation on each has been about equally rapid. 'Neither of the two means of communication has prevented the development of the other.'

"Though the railroads and waterways ought to be competitive means of transportation, they ought not to antagonize each other. Only the benefits which the railroad receives from the waterway have been cited; but the aid is reciprocal. The well-located and well-constructed waterway need not fear co-ordination with the railway; indeed, the attainment of the highest degree of usefulness is otnerwise impossible. The railroad must be present to aid in distributing the finished products manufactured from the articles transported by water, or there will be but small freight by water. Not only these manufactured goods but such articles of consumption as pass directly from the waterway to the consumers must be distributed by the railway, for water routes are few in number, and reach, directly, but a very limited number of consumers. The general relation of waterways and railroads, as collectors and distributors respectively, is shown by the shipments into and out of Paris by water and by rail in 1890. The waterways brought to Paris 4,037,719 tons, and the railroads 5,826,548 tons, the percentage carried by each being 41 per cent. and 59 per cent. respectively; but of the freight from Paris, which, of course, consisted mostly of manufactured articles, the waterways carried only 953,834 tons, while the railroads transported 2,335,252 tons, the percentages being 29 per cent. and 71 per cent. respectively. This took place, however, with very poor connections at the ports between the waterways and the railroads, so poor, indeed, as to greatly limit trans-shipment. The close connection of the waterway with the railroad, so that shipment from one to the other may be easily accomplished, is hardly less essential to the waterway's best use than the improvement of the way itself.

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"The division of freight between the two means of transportation is not, of course, into two distinct classes—one class going by water and one by rail—for each agent carries many kinds of articles that the other does. Still, the waterway reduces the ration which the bulkier goods would otherwise bear to the more profitable classes of rail freight, and this is to the advantage of the net returns on the capital invested in railroads.

"The State (referring now to State ownership of Railways and

Canals), furthermore, by extending inland waterways, would save not alone in amount of necessary investment in railroads, but also in expenses of operation relatively to gross receipts. As was seen, the costs of operation are a very large share of the gross receipts from the freight that would mostly go to the waterway, and the waterway would enable the railway to develop a kind of traffic where net receipts above costs of operation are larger. Thus it comes about that both burdens of expense which the railroads must meet, interest on investment and costs of operating, are rendered lighter when the waterways co-operate with the railroads in the transportation of freight. The development of inland navigation has also been shown to increase rather than to lessen the volume of traffic by rail. Waterways, therefore, enable the State to reduce tariffs on its railroads and still receive as large a net return on their business as would be possible without the traffic by water.

"Because of the fact that the inland waterways and the State railways of Prussia are under the control of different officials there has been a good deal of rivalry between the two means of communication. The managers of the railroads have been anxious to show a surplus, and have opposed the extension of inland waterways. Of late this opposition seems to have weakened. Prussia has entered upon the construction of canals, and the connection of the two means of transportation has been made closer, without detriment either to the traffic or net receipts of the railroads. The Prussian Minister of Public Works, Thielen, said in 1891:—'The subsequent development of the railway service must go on simultaneously with the improvement of the navigable ways. The navigable way is the sister, equal by birth, of the railway.'

"The commercial position of the waterway, and its influence on the tariffs and revenues of the railroad are well stated by the following resolution of the Fourth International Congress on Inland Navigation:—'The existence and development together of railways and waterways is desirable, first, because these two means of transport are the complements of each other, and ought to contribute each according to its special merits to the public good; second, because, viewed broadly, the industrial and commercial development which will result from the improvement of the means of communication must in the end profit both railways and waterways.'"

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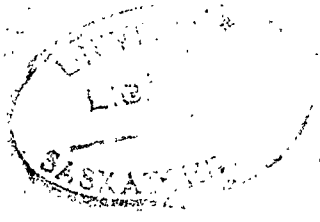

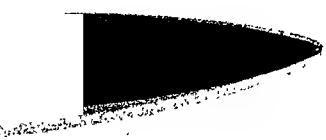

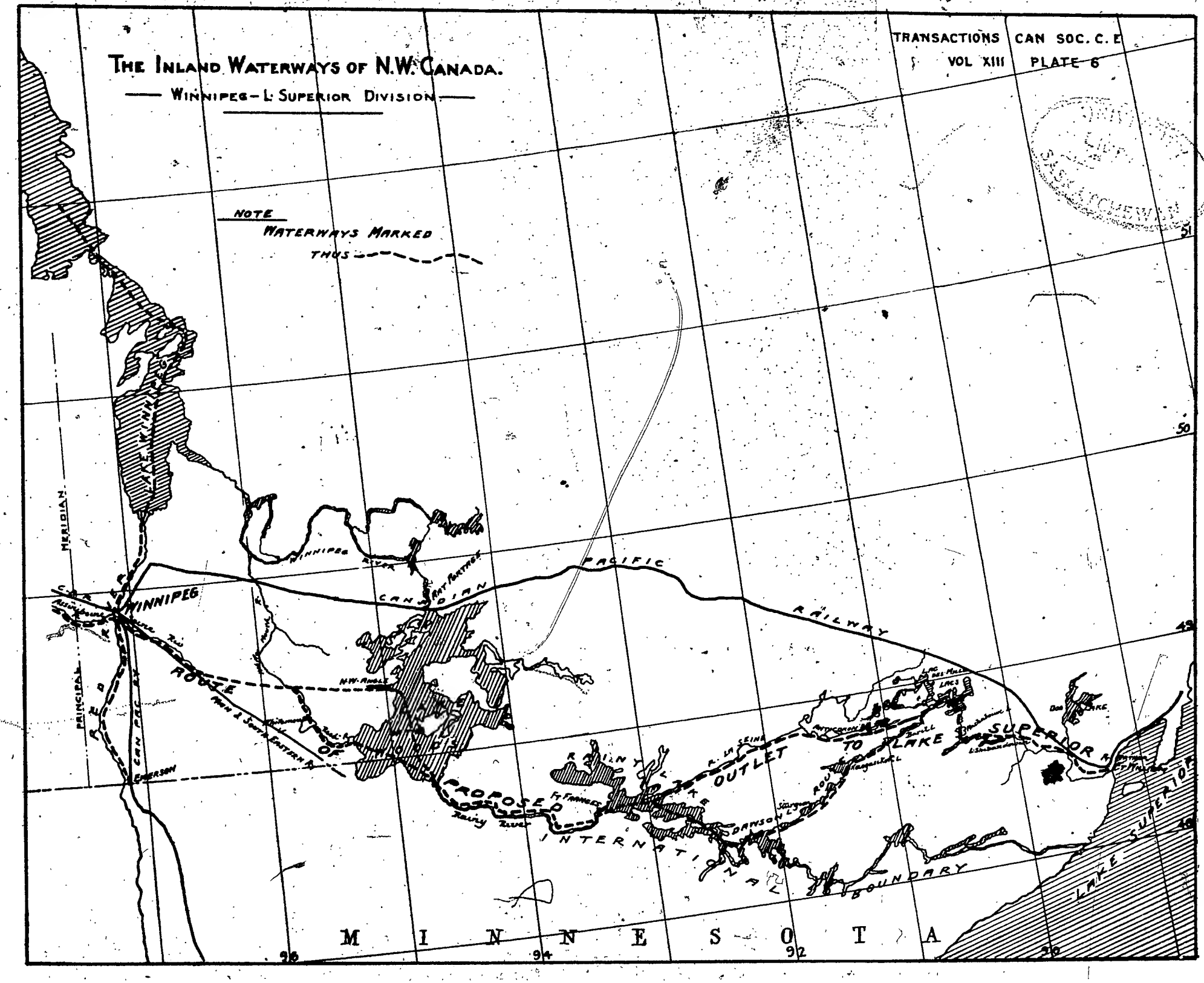
THE INLAND WATERWAYS OF N.W. CANADA.
— WINNIPEG – L. SUPERIOR DIVISION —
TRANSACTIONS CAN SOC. C. E.
VOL XIII PLATE 6
NOTE
WATERWAYS MARKED
THUS
LAKE WINNIPEG
WINNIPEG RIVER
CANADIAN PACIFIC RAILWAY
WINNIPEG
PRINCIPAL MERIDIAN
RED RIVER
CAN. PAC. R.Y.
EMERSON
ROSEAU
PATH & SOUTH EASTERN R.
N.W. ANGLE
PROPOSED
INTERNATIONAL
BOUNDARY
RAINY L.
RAINY RIVER
OUTLET
TO
LAKE
SUPERIOR
DAWSON
LAKE
SUPERIOR
MINNESOTA
96
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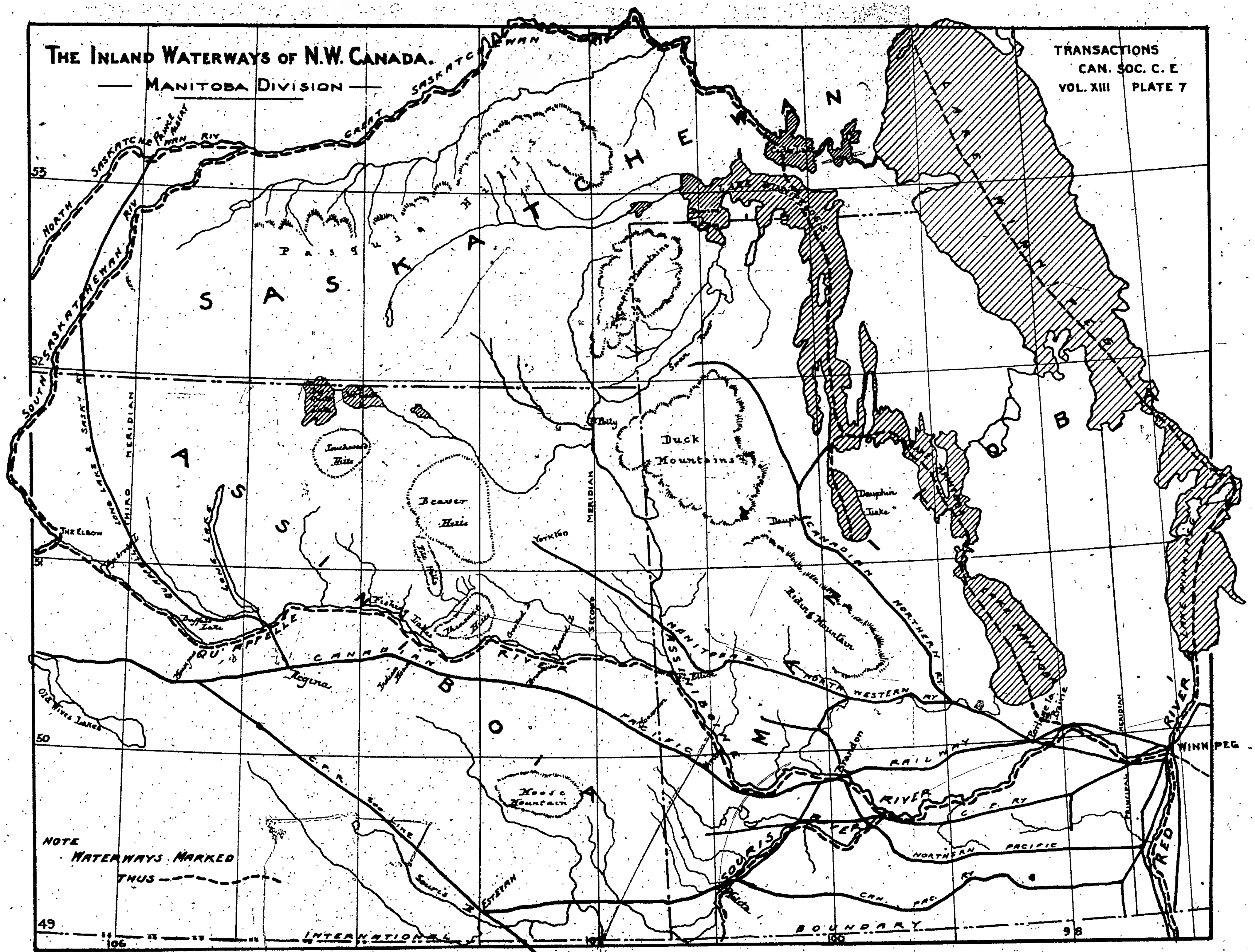
THE INLAND WATERWAYS OF N.W. CANADA.
MANITOBA DIVISION
TRANSACTIONS
CAN. SOC. C. E
VOL. XIII PLATE 7
SASKATCHEWAN
ASSINIBOIA
MANITOBA
NORTH SASKATCHEWAN RIV
SOUTH SASKATCHEWAN RIV
GREAT SASKATCHEWAN
Prince Albert
Pasquia Hills
Duck Mountains
Beaver Hills
Moose Mountain
Riding Mountain
Dauphin Lake
Dauphin
THE ELBOW
LONG LAKE
Buffalo Lake
Fishing Lakes
QU'APPELLE
Regina
Yorkton
Winnipeg
Brandon
Souris
Estevan
Old Wives Lakes
THIRD MERIDIAN
SECOND MERIDIAN
PRINCIPAL MERIDIAN
CANADIAN PACIFIC RAILWAY
CANADIAN NORTHERN RY
MANITOBA & NORTH WESTERN RY
NORTHERN PACIFIC
CAN. PAC. RY
C. P. RY
C.P.R. Soo Line
ASSINIBOINE RIVER
SOURIS RIVER
RED RIVER
INTERNATIONAL BOUNDARY
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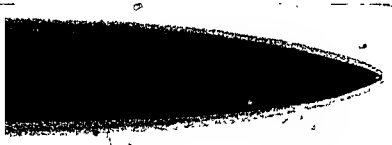
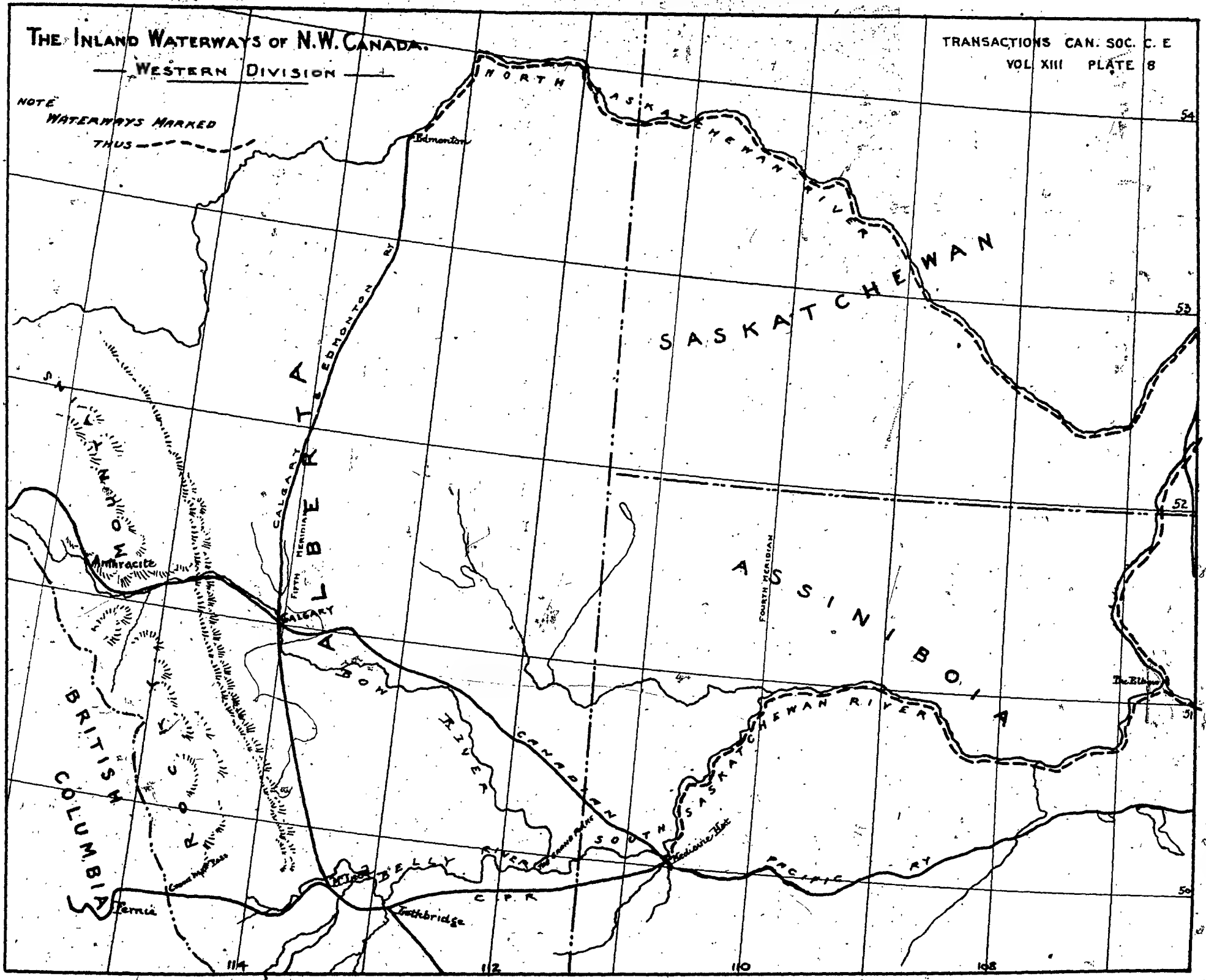
NOTE
WATERWAYS MARKED
THUS

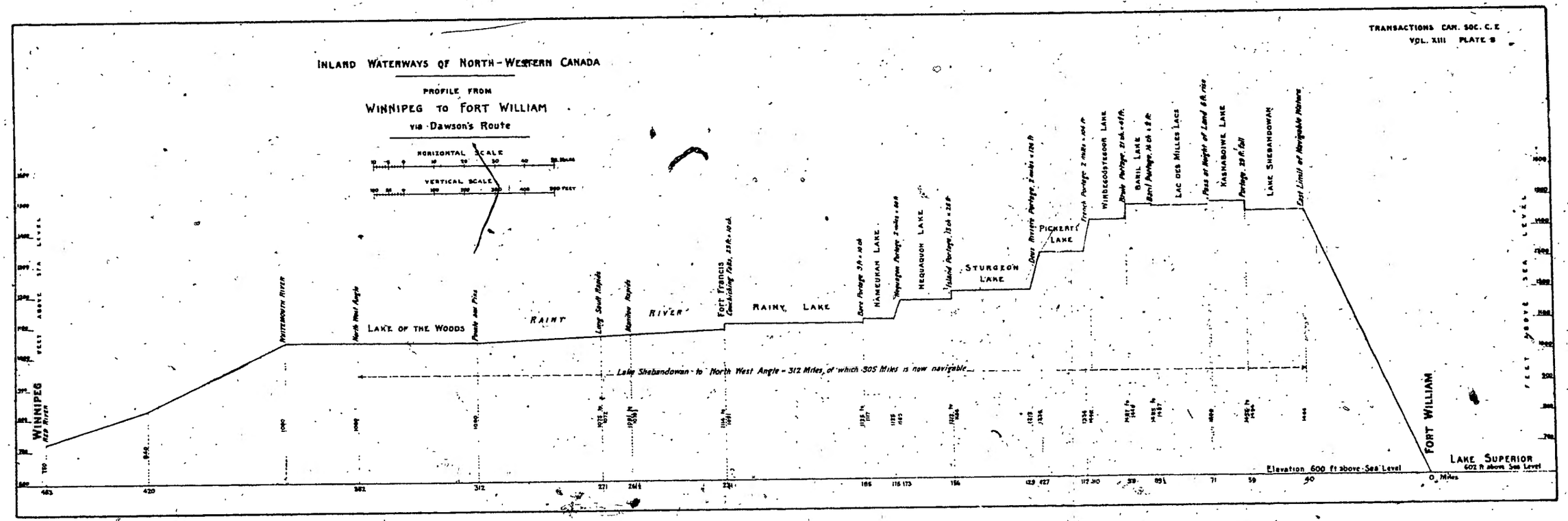



THE INLAND WATERWAYS OF N.W. CANADA.
— WESTERN DIVISION —
TRANSACTIONS CAN. SOC. C. E
VOL XIII PLATE 8
NOTE
WATERWAYS MARKED
THUS
NORTH SASKATCHEWAN RIVER
Edmonton
CALGARY & EDMONTON RY
SASKATCHEWAN
ALBERTA
SYNCLINORIUM
Anthracite
CALGARY
FIFTH MERIDIAN
FOURTH MERIDIAN
ASSINIBOIA
BOW RIVER
CANADIAN SOUTH SASKATCHEWAN RIVER
Medicine Hat
The Elbow
BRITISH COLUMBIA
COAL
Fernie
Crow's Nest Pass
BELLY RIVER
C.P.R
PACIFIC RY
Lethbridge
54
53
52
51
50
114
112
110
108

TRANSACTIONS CAN. SOC. C. E.
VOL. XIII PLATE 8

INLAND WATERWAYS OF NORTH-WESTERN CANADA

PROFILE FROM WINNIPEG TO FORT WILLIAM via Dawson's Route



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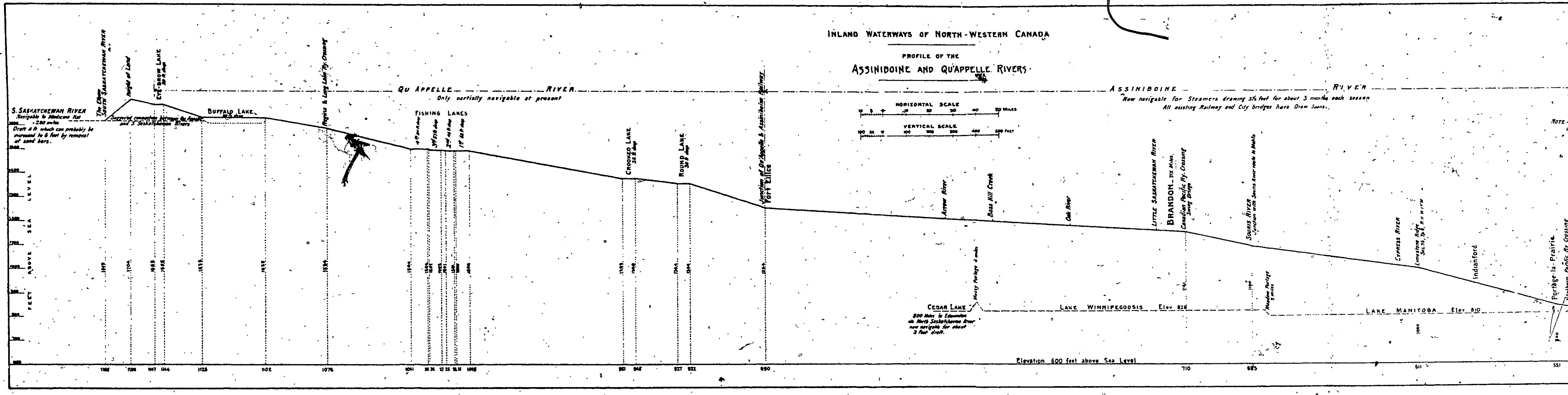

INLAND WATERWAYS OF NORTH-WESTERN CANADA
PROFILE OF THE
ASSINIBOINE AND QU'APPELLE RIVERS
HORIZONTAL SCALE
VERTICAL SCALE
S. SASKATCHEWAN RIVER
Navigable to Medicine Hat 280 miles
Draft 4 ft which can probably be increased to 6 feet by removal of sand bars.
The Elbow South Saskatchewan River
Height of Land
Eye-Brow Lake
Suggested connection between Qu'Appelle and S. Saskatchewan Rivers
Buffalo Lake
QU APPELLE RIVER
Only partially navigable at present
Fishing Lakes
Crooked Lake
Round Lake
Junction of Qu'Appelle & Assiniboine Railway
Fort Ellice
ASSINIBOINE RIVER
Now navigable for Steamers drawing 3½ feet for about 3 months each season
All existing Railway and City bridges have Draw Spans.
Arrow River
Bass Hill Creek
Oak River
Little Saskatchewan River
BRANDON
Canadian Pacific Ry. Crossing
Souris River
Cypress River
Indianford
Portage-la-Prairie
Cedar Lake
Lake Winnipegoosis Elev. 828
Lake Manitoba Elev. 810
FEET ABOVE SEA LEVEL
Elevation 600 feet above Sea Level

2 of 2

TRANSACTIONS CAN. SOC. C. E
VOL. XIII PLATE 10

INLAND WATERWAYS OF NORTH-WESTERN CANADA

PROFILE OF THE ASSINIBOINE AND QU'APPELLE RIVERS